

May 17, 2013

LTR: BYRON 2013 -0062
File: 1.10.0101

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001


Subject: Licensee Event Report (LER) 455-2013-001-00, "Unit 2 Manual Reactor Trip
Due to Loss of Main Generator Stator Cooling Water"

Byron Station, Unit 2
Facility Operating License No. NPF-66
NRC Docket No. STN 50-455

Enclosed is an LER concerning the Byron Station Unit 2 manual reactor trip that occurred on March 20, 2013. This condition is reportable to the NRC in accordance with 10 CFR 50.73(a)(2)(iv)(A) – System Actuation.

Should you have any questions concerning this submittal, please contact Mr. Steven Gackstetter, Regulatory Assurance Manager, at (815) 406-2800.

Respectfully,



Faber A. Kearney
Site Vice President
Byron Station

FAK/DS/cy

Enclosure: LER 455-2013-001-00

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Byron Nuclear Power Station

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2013					
LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block)				Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.							
1. FACILITY NAME Byron Station, Unit 2				2. DOCKET NUMBER 05000455		3. PAGE 1 OF 3					
4. TITLE Unit 2 Manual Reactor Trip Due to Loss of Main Generator Stator Cooling Water											
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED		
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME		DOCKET NUMBER
03	20	2013	2013 - 001 - 00			05	20	2013	N/A		N/A
9. OPERATING MODE			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)								
1			<input type="checkbox"/> 20.2201(b) <input type="checkbox"/> 20.2203(a)(3)(i) <input type="checkbox"/> 50.73(a)(2)(i)(C) <input type="checkbox"/> 50.73(a)(2)(vii) <input type="checkbox"/> 20.2201(d) <input type="checkbox"/> 20.2203(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(ii)(A) <input type="checkbox"/> 50.73(a)(2)(viii)(A) <input type="checkbox"/> 20.2203(a)(1) <input type="checkbox"/> 20.2203(a)(4) <input type="checkbox"/> 50.73(a)(2)(ii)(B) <input type="checkbox"/> 50.73(a)(2)(viii)(B) <input type="checkbox"/> 20.2203(a)(2)(i) <input type="checkbox"/> 50.36(c)(1)(i)(A) <input type="checkbox"/> 50.73(a)(2)(iii) <input type="checkbox"/> 50.73(a)(2)(ix)(A) <input type="checkbox"/> 20.2203(a)(2)(ii) <input type="checkbox"/> 50.36(c)(1)(ii)(A) <input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A) <input type="checkbox"/> 50.73(a)(2)(x) <input type="checkbox"/> 20.2203(a)(2)(iii) <input type="checkbox"/> 50.36(c)(2) <input type="checkbox"/> 50.73(a)(2)(v)(A) <input type="checkbox"/> 73.71(a)(4) <input type="checkbox"/> 20.2203(a)(2)(iv) <input type="checkbox"/> 50.46(a)(3)(ii) <input type="checkbox"/> 50.73(a)(2)(v)(B) <input type="checkbox"/> 73.71(a)(5) <input type="checkbox"/> 20.2203(a)(2)(v) <input type="checkbox"/> 50.73(a)(2)(i)(A) <input type="checkbox"/> 50.73(a)(2)(v)(C) <input type="checkbox"/> OTHER <input type="checkbox"/> 20.2203(a)(2)(vi) <input type="checkbox"/> 50.73(a)(2)(i)(B) <input type="checkbox"/> 50.73(a)(2)(v)(D)								
100			Specify in Abstract below or in NRC Form 366A								
12. LICENSEE CONTACT FOR THIS LER											
FACILITY NAME									TELEPHONE NUMBER (Include Area Code)		
Steven Gackstetter, Regulatory Assurance Manager									(815) 406-2800		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT											
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX		
B	TS	MO	WEST	YES	N/A	N/A	N/A	N/A	N/A		
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE			MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE)						<input checked="" type="checkbox"/> NO					
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)											
<p>At 19:51 hours on March 20, 2013, Byron Unit 2 was manually tripped due to a loss of all Generator Stator Cooling Water (GC) when the 2A Generator Stator Cooling Water pump (2A GC) tripped and the redundant (2B GC) pump was unavailable due to a previous pump failure on February 17, 2013. The 2BEP -0, "Reactor Trip or Safety Injection Unit 2" procedure was entered and a transition was made to 2BEP ES 0.1, "Reactor Trip Response Unit 2." The root cause was the failure of the inboard motor bearing on the 2A GC pump motor due to insufficient lubrication as supplied by the vendor. This failure resulted in contact between the rotor and stator windings causing the electrical failure of the motor. Corrective actions include replacement of the failed motor and inspection of the remaining GC pump motors. All other plant systems operated as designed in response to the shutdown and, there were no safety consequences impacting plant or public safety as a result of this event. The Generator Cooling System is a non-safety related design feature and is not credited in any Updated Final Safety Analysis Report chapter 15 accident and transient analyses. The actuation of the reactor protection system was reported to the NRC in accordance with 10CFR 50.72 (b)(2)(iv)(B) and 10 CFR 50.73 (a)(2)(iv)(A).</p>											

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Byron Station, Unit 2	05000455	YEAR	SEQUENTIAL NUMBER	REV NO.	2 OF 3
		2013	- 001	- 00	

NARRATIVE

A. Plant Condition Prior to Event:

Event Date/Time: March 20, 2013 / 1951 hours CDT

Unit 2 - Mode 1 - Power Operations, Reactor Power 100%

Reactor Coolant System [AB]: Normal operating temperature and pressure.

Byron Station Unit 2 has two Generator Stator Water Cooling pumps (GC) [TJ] (i.e., 2A, and 2B). Normally, one pump is necessary to sustain cooling water flow to the unit's main generator. An automatic reactor trip will occur as a result of a main generator trip when generator cooling is lost for greater than 45 seconds. On February 17, 2013, the 2B GC pump was removed from service due to an emergent unrelated pump failure. No other structures, systems or components were inoperable at the start of the event that contributed further to this event.

B. Description of Event:

Following the emergent failure of the 2B Main Generator Stator Water Cooling (GC) [TJ] pump on 2/17/13, the 2A GC pump was started. A replacement pump was not immediately available (Parts to repair and return to service the 2B GC pump were being expedited) so the station established an Adverse Condition Monitoring Plan (ACMP) to monitor the 2A pump to assure it was operating acceptably. The increased monitoring included vibrations and thermography to be monitored twice weekly. Vibrations were most recently measured on 3/15/13, and thermography on 3/20/13, with no abnormalities identified. Overall velocity vibration levels were consistently taken and the spectra did not indicate any abnormal conditions.

At 1951 hours on March 20, 2013, Byron Unit 2 Reactor was manually tripped due to the loss of all GC. After running continuously for 31 days with no indications of abnormal operation, the 2A GC pump tripped with the 2B GC pump unavailable. The 2BEP-0, "Reactor Trip or Safety Injection Unit 2" procedure was entered and a transition was made to 2BEP ES 0.1, "Reactor Trip Response Unit 2."

As expected, an automatic Auxiliary Feedwater initiation and Feedwater Isolation also occurred due to the low level in the steam generators. All plant systems functioned as expected in response to the reactor trip. The actuation of the reactor protection system and the Auxiliary Feedwater initiation was reported to the NRC in accordance with 10CFR 50.72 (b)(2)(iv)(B) and 10 CFR 50.73 (a)(2)(iv)(A).

The site motor specialist inspected the motor following the failure. Although there was grease from the coupling on the motor housing, no grease was found in the drive-end bearing or bearing housing. The bearing housing cover and the damaged half of the cage were inspected and neither had any grease or grease residue visibly coating these parts.

LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
Byron Station, Unit 2	05000455	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 3
		2013	- 001	- 00	

NARRATIVE

C. Cause of Event:

The root cause was determined to be the failure of the 2A GC motor with the 2B GC pump previously removed from service. The failure of the 2A GC motor was caused by a failure of the inboard motor bearing on the 2A GC pump motor due to insufficient lubrication as supplied by the vendor. This failure resulted in contact between the rotor and stator windings causing the electrical failure of the motor.

The root cause evaluation also determined that although there was grease from the coupling on the motor housing, no grease was found in the drive-end bearing or bearing housing. The bearing housing cover and the cage were inspected and neither had any grease or grease residue visibly coating them. While the vendor refurbishment checklist documents that the bearings were re-packed, the post-failure inspection indicated that only the opposite drive-end bearing was packed with grease; the drive-end bearing was not. Since the bearings and bearing housings are concealed by the endbells once the motor is reassembled, it was not readily apparent that the bearing was not greased.

The motor was shipped to the Vendor to further investigate and determine the underlying cause of the failure and lack of lubrication.

D. Safety Analysis:

There were no safety consequences impacting plant or public safety as a result of this event. The GC system is a non-safety related design feature and is not credited in any Updated Final Safety Analysis Report chapter 15 accident or transient analyses. The reactor trip system functioned as designed and shutdown the reactor without incident. A risk analysis also indicates this event was not risk significant.

E. Corrective Actions:

The 2A GC pump motor was replaced prior to start up on Unit 2. The 2B GC pump has also been repaired and returned to service to support plant operations as needed.

Inspection and review of the Unit 1 GC pump motors have been completed to ensure that all of the bearings contain the appropriate amount of grease.

The process used to review motor refurbishment and motor installation will be evaluated to determine if any additional actions are needed to verify proper grease in the bearing housings.

F. Previous Occurrences:

There have been no previous occurrences of this nature.